

ER Site No. 1: Radioactive Waste Landfill (TAII)

ADS: 1303

Operable Unit: Tech Area II

Site History	1
Radioactive Waste Landfill (ER Site 1).....	2
Constituents of Concern.....	3
Current Hazards	3
Current Status of Work	4
Future Work Planned	4
Waste Volume Estimated/Generated	4

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Site History

The Radioactive Waste Landfill (RWL), ER Site 1, and the Chemical Disposal Pits (CDP), ER Site [3](#), are located in the eastern portion of Technical Area II (TA-II), about 25 feet (ft) west of the eastern apex of the TA-II perimeter fence.

In 1987, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed for the entire Sandia National Laboratories / New Mexico (SNL/NM) installation. At that time, ER Site 1 was identified as solid waste management unit (SWMU) Numbers 32 through 37, and ER Site [3](#) was identified as SWMU Number 40. Both sites were described as having the potential for release of hazardous waste or constituents. A more comprehensive assessment was performed under Phase 1 of the Comprehensive Environmental Assessment and Response Program (CEARP), during which ER Sites 1 and [3](#) were assessed and, again, were found to require additional investigation. The scope of the Phase 1 assessment included a literature and records search, interviews with current and former employees, and, in some cases, visual site inspections. No samples and only limited background data were collected during both the RFA and CEARP Phase 1 assessment.

The regional aquifer in the vicinity of ER Sites 1 and [3](#) is within the upper unit of the Santa Fe Group. The depth to groundwater in the monitor well nearest to ER Sites 1 and [3](#) (TA2-NW1-595) is approximately 520 ft below ground surface (fbgs) or 4,889.3 ft above mean sea level. TA2-NW1-595 has a total depth of 598 fbgs. A shallow water-bearing zone also exists in the vicinity of ER Sites 1 and [3](#). The depth to the shallow zone ranges from approximately 267 to 320 fbgs. Monitor wells TA2-SW1-325, TA2-NW1-320, WYO-2, TA2-W-19, and TA2-W-01 are located in the vicinity of ER Sites 1 and [3](#) and are screened in the shallow water-bearing zone.

The area is essentially flat, with a gentle slope to the west of approximately 4 percent. Tijeras Arroyo, the largest drainage feature at SNL/NM, is located immediately southeast of TA-II. The surface geology consists of unconsolidated alluvial and colluvial deposits derived from the Sandia and Manzanita Mountains. These deposits consist of sediments ranging from clay to gravel derived from the granitic rocks of the Sandia Mountains and greenstone, limestone, and quartzite derived from the Manzanita Mountains.

Surficial deposits are underlain by the upper unit of the Santa Fe Group. In this area, the piedmont-slope alluvium may be up to 100 ft thick, and the upper Santa Fe unit is approximately 1,200 ft thick.

The piedmont-slope alluvium, which was deposited by the ancestral Tijeras Arroyo, is generally coarse-grained sand and gravel. The upper Santa Fe unit was deposited from 5 to 1 million years ago and consists of coarse- to fine-grained fluvial deposits from the ancestral Rio Grande that intertongues with coarse-grained alluvial-fan/piedmont-veneer facies, which extend westward from the Sandia and Manzanita Mountains. ER Sites 1 and [3](#) are near the easternmost limit of the ancestral Rio Grande deposits.

More detailed site history information is included below and it is subdivided between the two sites.

Radioactive Waste Landfill (ER Site 1)

Initial information about the RWL was based on employee interviews. The RWL had three pits and three trenches where low-level radioactive waste was disposed of from 1949 to 1959. Supposedly, after March 1959, all radioactive waste was disposed of at a separate facility in TA-III, although one item removed from the landfill was dated 1978.

The RWL pits were approximately 12 ft wide by 20 ft long by 25 ft deep. The trenches ranged from 5 to 15 ft wide, 25 to 50 ft long, and 15 ft deep. The pits and trenches were labeled as Pits 1, 2, and 7 and Trenches 3/4, 5, and 6. The majority of the waste was not containerized before disposal. The pits and trenches were unlined and did not contain leachate detection or collection systems. The pits and trenches were filled with debris, and then covered with native soil and capped with 3 ft of concrete.

No detailed records of material disposed of in the RWL are available. However, U.S. Department of Energy (DOE) Solid Waste Information Management System records showed that an estimated 11,110 cubic ft of radioactive material was buried in the landfill, with an estimated total activity of 2,847 curies.

Material disposed in the RWL mainly consisted of solids, although lesser amounts of liquids were present. Chemical hazards included lead, which was typically used for radioactive shielding, thermal batteries, and nitric acid.

The RWL primarily contained low-level materials, although a small amount of transuranic material was also present in the landfill. Most of the material buried in the RWL consisted of weapons components, irradiated and neutron-activated material, thermal batteries, and

radioactive sources. The weapons components and materials contained depleted uranium, thorium, tritium, cobalt, cesium, americium, and plutonium.

In 1954, tritiated material, mainly from booster cylinders, was reportedly buried in the RWL. Other items buried in the RWL included neutron generator parts, irradiated material from nuclear rocket tests, and radium-beryllium neutron sources. In addition, cobalt sources were buried in the RWL. Cesium-containing gap tubes and tracer materials collected on fallout plates were also buried in the landfill.

Other materials in the RWL were laboratory-generated, such as contaminated gloves, pipettes, absorbent pads, forceps, beakers, test tubes, paper, tools, clothing, and soil and bioassay samples. Some of the samples reportedly contained hydrochloric acid, toluene, and possibly other organic compounds [Chemical Disposal Pits \(ER Site 3\)](#)

Initial information about the CDPs was based on employee interviews. The CDPs reportedly were used in the late 1940s and 1950s to dispose of chemical waste. One former employee recalled that one disposal pit was approximately 10 ft by 30 ft with depth unknown. The pits were unlined and were not constructed with leachate containment or monitoring devices. No records were maintained regarding the exact locations of the pits, the types or volumes of chemicals disposed of in the pits, how chemicals were disposed of, how the pits were excavated, or the exact length of time the pits were actually used.

Constituents of Concern

Lead
Plutonium
Toluene
Neutron-active material
Depleted Uranium
Tritium
Radium
Cobalt-60
Nickel-63
Cesium-137
Strontium-90
Radium-beryllium neutron pellets

Current Hazards

Physical: The landfill excavation is approximately twelve feet deep with steep sides and is unfenced.

Chemical: None

Radiological: The landfill excavation is posted as a soil contamination area. As a precaution, do not walk or drive on any soil piles adjacent to the excavation due to low levels of radioactive material in soil.

Current Status of Work

ER Site 3, Chemical Disposal Pits (CDPs), and ER Site 1, the Radioactive Waste Landfill (RWL), were combined into one site in June of 1995. Investigations included passive soil vapor surveys, geophysical surveys, surface soil sampling, and surface radiation surveys.

Remediation of this site was completed voluntarily (as a Voluntary Corrective Measure, or VCM) in late 1996. The containerized wastes include mixed and radioactive debris and radioactive soil. The debris and radioactive soils that were accumulated during the VCM has been disposed. Approximately 9,400 cubic yards (cy) of soil were removed during excavation. Of this amount, approximately 400 cy were disposed as radioactive waste. Another 3,000 cy were slightly radioactive. The remaining 6,000 cy was clean overburden material. Subsequent to review and approval of a radiological risk assessment, the slightly radioactive soil will be placed at the bottom of the excavation, covered with the 6,000 cy of clean soil, then additional clean soil will be brought in (if necessary) to complete the backfill to grade.

A No Further Action (NFA) proposal was submitted to the New Mexico Environment Department (NMED) in September 1997. A Request For Supplemental information (RSI) was submitted in December of 2002 to NMED which should facilitate NFA final approval.

Future Work Planned

In June 1999, NMED indicated that the site may be appropriate for NFA petition pending review and approval of supplemental information, consisting of a revised risk assessment, new verification samples (collected in November 1999), and information on the material excavated. This information has been submittal. The site will be backfilled and revegetated in the spring of 2003.

Waste Volume Estimated/Generated

Approximately 96 cubic yards (cy) of debris were accumulated from the landfill excavation at the site, of which 80 cubic yards were radioactive and the rest mixed hazardous and radioactive waste. All of this debris and radioactive/mixed waste have been disposed off-site. Of the 3,400 cubic yards of radioactive soil, 400 cy were disposed off-site as radioactive waste. The remaining 3,000 cy of slightly radioactive soil will be returned to the excavation as backfill, based on a radiological risk assessment.

Information for ER Site 1 was last updated Jan 24, 2003.